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The Quick Cruise Circular Slide Rule

The quick cruise volume tables published by R. M. Godman[1/] were based on averages of a large number of plots. Any one plot might be in considerable error. Godman's tables give a great deal of information about average conditions on a plot of a certain log height, average diameter, and number of trees. The Quick Cruise Circular Slide Rule shown on the attached sheet was devised to give an accurate per-acre volume, in board feet Scribner for any 1/5-acre plot.

The timber cruiser often needs on-the-ground volume estimates of the timber in which he is working to determine if the stand will meet certain volume specifications, to obtain volume by types, or for training himself in volume estimating.

The device consists of two discs of waterproof material and a movable pointer which can be made as shown, or a hairline in the center of a transparent plastic pointer or indicator may be substituted for the pointer shown.

In constructing the outer, cumulative scale, the maximum volume per acre that would normally be encountered in Southeast Alaska, 100 M feet board measure, was determined. The scale was marked off in equal units with 360 degrees of arc equal to 100 M per acre, the main graduations being 1000 board feet. Subdivisions allow interpolation to about 100 board feet.

The inner disc, slightly smaller than the first, shows two volume tables based on those form classes which were found to be average for the most common species in the area: 82 for western hemlock and Sitka spruce, and 75 for western redcedar.[2/] On this disc number of 16-foot logs are arranged in concentric circles which correspond to the number-of-log columns of form class volume tables. The radial distance from the center of the disc to the number of logs is marked on the indicator. The volume of each tree is represented by the arc distance from a zero point to a mark representing the tree's d.b.h. in the appropriate circular log-height column.

Instructions for Use

To compute timber volume on a plot first place the indicator at "zero" on the outer or cumulative volume scale. Next turn the inner disc until the appropriate d.b.h. mark on the tree scale lies beneath the correct log height on the indicator arm.

1/ Godman, R. M. A site classification and "quick-cruise" volume table for climax stands. Tech. Note No. 11, March 1951, Alaska Forest Research Center.

2/ Andersen, H. E. Girard form class comparisons for three major species in Southeast Alaska. Tech. Note No. 26, May 1955, Alaska Forest Research Center.

Next move the indicator in a clockwise direction until the zero line on the inner disc is reached.

Repeat the operation for subsequent trees, being careful not to move the indicator when turning the tree scale. When all trees 12" d.b.h. and larger on the 1/5-acre plot have been tallied in the above manner, read the plot volume per acre from the outer, cumulative-volume scale.

When cedar also occurs on the plot, gross volume of all three species may be obtained in one tally by alternate use of both volume scales on the smaller disc.

To make this particular circular rule the diagram shown can be traced and transferred to stiff celluloid or plastic discs. The three components are fastened together in such a way as to prevent the arm, or indicator, from being shifted accidentally when the smaller disc is being moved. A bushing is used as a separator. For other average form classes different inner discs would have to be made. To do this:

1. Make the outer disc and graduate it.

2. Set the blank inner disc on its axis.

3. Put the indicator arm on the axis, using the type in the diagram. The right edge of this is a radius from the center.

4. Take the form class volume table desired and change each figure to per-acre volume. If 1/5-acre plots are used multiply the figure by 5.

5. Set the arm on zero of the outer disc and hold it or clip it there. Mark zero on the inner disc. Move the inner disc clockwise and mark a dot for the volume of the smallest diameter and number of logs to be used. For example, if you start with 20 inches and 2 logs and have an average form class of 84 and use 1/5-acre plots, the volume is 22 x 5 = 110 Dec. C = 1100 per acre. Set the inner disc zero on 1100. Mark a dot on the inner disc at the 2-log line of the indicator. Get the volume per acre of the same diameter for 3 logs and still holding the indicator on zero, move inner disc to that volume and mark 3 logs. Repeat the process for all diameters and log lengths.

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A. S. Harris

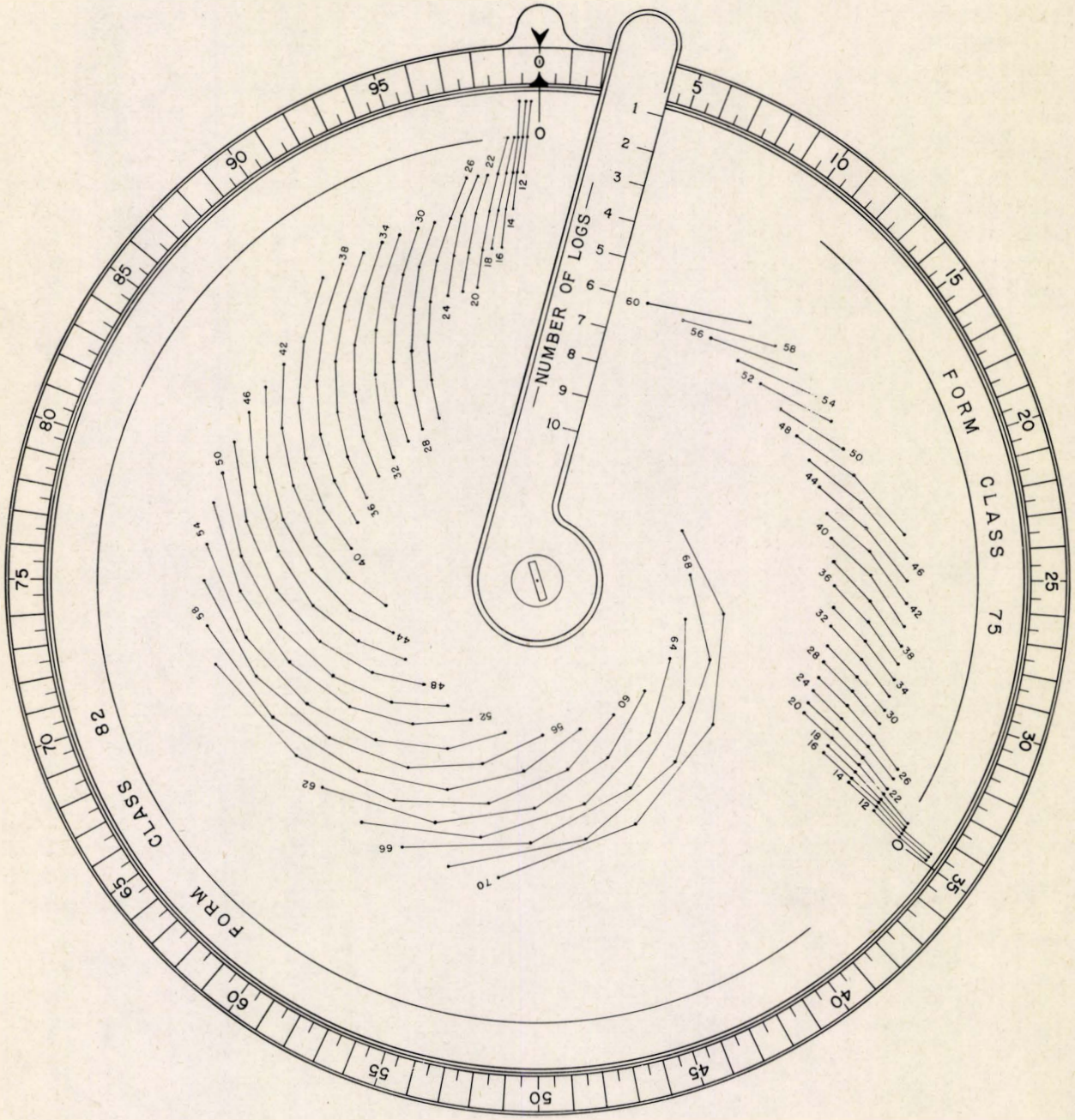

Fig. 1.--Circular slide rule assembled

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